An Illuminating Summary of California's New Title 24 Residential Lighting Building Code

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April 2004

My Talk

- Summarize Title 24 requirements.
- Stress the magnitude of the opportunity and the need to be ready.
- Identify potential issues/concerns.
- Stress need to be ready.
- Emphasize need to be ready.
- Reiterate importance of being ready…….

The Basics

- CEC – California Energy Commission
- Title 24
  - CA building energy code
  - Residential lighting section upgraded dramatically. Takes effect Oct. 1, 2005.
  - Covers hard-wired fixtures only (i.e., not portables)

The expert: Gary Flamm, gflamm@energy.state.ca.us

Scope

- Covers new construction
  - Single and multi-family homes
  - Interior lighting in hotel/motel guest rooms.
- For a copy of the code go to:

http://www.energy.ca.gov/2005_standards/rulemaking/documents/index.html

Hi-Efficacy Lighting

- Must not be screw-based
- Efficacy levels:

Wattage	Efficacy
≤ 15 W	40 LPW
15-10 W	50 LPW
> 40 W	60 LPW

How to determine system efficacy

For all pin-based fluorescent systems, only the watts of the lamp (not the ballast) need to be considered. Divide the initial lamp lumens by the lamp watts.

Virtually all pin-based fluorescent systems will qualify as HIGH-efficacy for the residential lighting standards.

	Initial Lumens	÷ Watts	= Efficacy
(13-watt Quad)	900	÷ 13	= 69.2 lpw

How to determine system efficacy

All screw based lighting systems without factory installed hardwired ballasts are considered LOW-efficacy.
All low-voltage incandescent lighting is considered LOW-efficacy lighting (including tungsten halogen, MR-11 and MR-16).

Recessed luminaires in insulated ceilings

2001 Standards	2005 Standards
Must be approved for zero-clearance insulation cover (IC)	
	AND must be certified air-tight (AT) 

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Kitchen Lighting

2001 Standards	2005 Standards
General lighting must be high efficacy	At least 50% of installed wattage must be high efficacy. Lighting in areas adjacent to the kitchen (*i.e.* Nook) is considered kitchen lighting if it is on the same switch as the kitchen lighting.
Additional luminaires used for decorative effects need not meet this requirement	

Kitchen

- 50% of installed wattage must be high efficacy.
- Switching for hi-efficacy and low-efficacy lights must be separate.
- Editorial – use of incandescent recessed cans will cause huge builder expense. Kitchen lighting designs and fixtures used will change dramatically.

How to determine WATTAGE for Kitchen Lighting

When calculating the energy use of low-efficacy (screw-based) lighting for residential kitchens, it does not matter what lamp wattage or lamp type is used in a screw-based fixture.

It must always be assumed that an incandescent lamp of the maximum relamping rated wattage will be used.

How to determine WATTAGE for Kitchen Lighting

Low Efficacy System	Required High Efficacy System
2 recessed cans with screw based sockets. Relamping rated wattage on factory installed label = 100 Watts Low Efficacy System = 200 Watts	**<u>Minimum Required:</u>** 200 Watts Example: 5 CF fixtures x 26 watts = 130 watts Plus minimum 70 Watts high efficacy/electronic ballasts under cabinet lighting

Bathroom Lighting

2001 Standards	2005 Standards
Definition of a Bathroom: Each room containing a shower or tub 	**Definition of a Bathroom**: Bathroom is a room containing a shower, tub, toilet or a sink that is used for personal hygiene.

Bathroom Requirement

A. High efficacy

or

B. Any fixture provided its controlled by manual on//automatic/manual off occupancy sensors.

Bathrooms, Garages, Laundry Rooms, and Utility Rooms

2001 Standards	2005 Standards
In 2001, Bathrooms are addressed separately from Garages, Laundry Rooms, and Utility Rooms.	Lighting in Garages, Laundry Rooms, and Utility Rooms must all meet the same requirements as apply to Bathrooms.  Motion control wall switch

For all other rooms (i.e. hallways, stairs, dining rooms, etc.)

2001 Standards	2005 Standards
No requirements	All hardwired lighting must be high efficacy, or controlled by a manual-on motion sensor, or controlled by a dimmer. Exception: Closets less than 70 square feet are exempt from this requirement

Outdoor lighting attached to a building

2001 Standards	2005 Standards
No requirements unless used as an alternate option for high efficacy bathroom lighting  © Progress Lighting, used by permission	All outdoor lighting attached to buildings must be high efficacy, or controlled by both a motion sensor AND photocontrol Lighting NOT attached to a building, like landscape lighting, is exempt from this requirement

Residential parking lots and garages for 8 or more vehicles

2001 Standards	2005 Standards
No requirements	Must meet the lighting requirements for nonresidential buildings

Common Areas of low-rise residential buildings with 4 or more dwelling units

2001 Standards	2005 Standards
No requirements	All hardwired lighting must be high efficacy or controlled by an occupancy sensor.

What Does All This Mean?

- Demand for pin-based fixtures, especially recessed cans, will explode.
- Many builders may choose the “manual on” occupancy sensors instead.
- Demand for replacement lamps likely to grow as well.

Market Prep

1. Builders need to redesign their lighting specifications (will need different fixtures).
2. Make sure everyone in the chain (product designers, marketing, production, distributors) are aware of the code changes and poised to deliver.
3. Manufacturers should create marketing materials targeted to the CA market (i.e., meets Title 24) cluster qualifying products in the catalog.
4. Make sure 26W, IC, air tight cans with electronic ballasts are available.

Energy Star vs. Title 24

- CA high efficacy requirements are a subset of Energy Star. Energy Star has start time, warranty, etc. requirements.
- BEWARE:
  1) CA cans in conditioned spaces must be air tight.
  2) CA requires electronic ballasts (no magnetics) for ≥ 13 W fixtures.

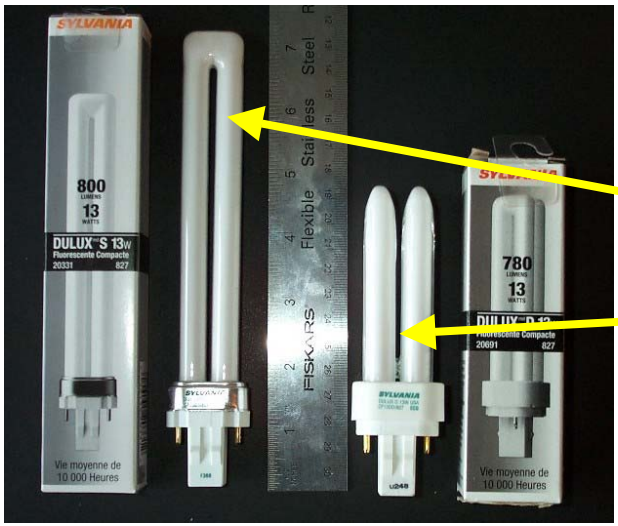
Early Compliance Credit

- To jump start the market and to get builders ready, the CEC is offering an "early compliance credit" through 10/1/05.
- If builder meets the 2005 lighting requirements, they receive a credit of 1.5 KBtu/ft^2.
- On-site inspection by HERS rater required.
- Credit gives builder flexibility to add more window area, or make other tradeoffs.

Lamp/Socket Compatibility

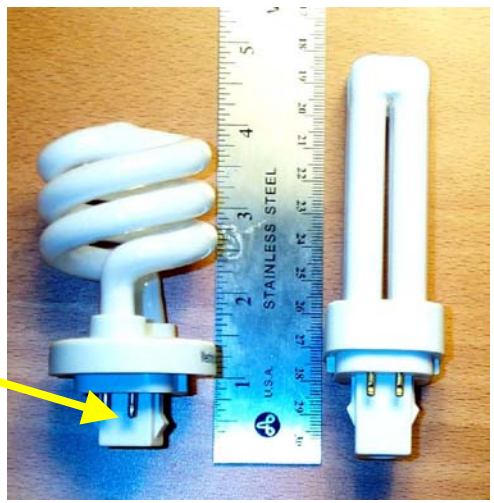
- Still lots of pin/socket combinations
  - 2-pin versus 4-pin
- No “universal” 60W replacement. Multiple versions of 13W lamp bases and sockets.

Sample Plug-In Lamps



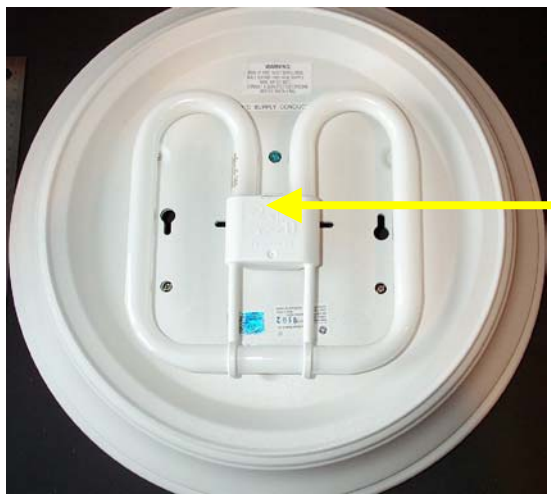
- Both lamps are 13-watt, 2-pin
  - 13-watt twin tube (GX23 base)
  - 13-watt quad tube (GX23-2 base)

- Both lamps are 13-watt, 4-pin with a G24q-1 base
- Note: Westinghouse twist version has a “short” G24q-1 base so a std lamp won’t make contact in the socket!



Dangerous Trends

- Some manufacturers introducing new fixture lines that only accept their company's lamp.
- Examples: Westinghouse, TCP, GE and Sunpark.



GE ceiling round using a 55-watt 2D lamp

GRY10q-3 socket

What's wrong in these pictures?

Westinghouse Bath Bar Fixture

- Proprietary 4-pin 13-watt "short" G24q-1 base lamp
- Non-enclosed ballast (i.e. looks like a screw-base CFL ballast, and will not be replaceable upon failure)

Two flavors of the 2-pin 13-watt lamp that look IDENTICAL!

- One uses "Instant Start" required by ENERGY STAR
- The other uses standard "glow bottle" lamp

BIG CHANGES AHEAD

START GETTING READY NOW!